

WHAT IS CLAIMED IS:

1. A method of fabricating an array substrate for use in a transflective liquid crystal display device, the method comprising the steps of:

forming a gate line, a gate electrode and a gate pad all having a first layer and a second layer structure on a substrate;

forming a gate-insulating layer on the substrate to cover the double-layered gate line, the double-layered gate electrode and the double-layered gate pad;

forming an active layer and an ohmic contact layer over the gate electrode;
forming a data line, source and drain electrodes on the ohmic contact layer, a capacitor electrode over the gate line and a data pad at the end of the data line;

forming a first passivation layer to cover the data line, source and drain electrodes, the capacitor electrode and the data pad, the first passivation layer having a first drain contact hole to the drain electrode, a etching hole corresponding to a transmissive portion, a first capacitor contact hole to the capacitor electrode, a first gate pad contact hole to the gate pad, and a data pad contact hole to the data pad;

forming a gate pad terminal, a data pad terminal and a transparent electrode in the transmissive portion, the gate pad terminal contacting the gate pad through the first gate pad contact hole, the data pad terminal contacting the data pad through the first data pad contact hole, and transparent electrode contacting the drain electrode and capacitor electrode through the first drain and capacitor contact holes;

forming a second passivation layer to cover the transparent electrode, the gate pad terminal and the data pad terminal, the second passivation layer having a second drain contact hole over the drain electrode, a second capacitor contact hole over the capacitor electrode, a

second gate pad contact hole over the gate pad, and a second data pad contact hole over the data pad;

forming a corrosion-resistant metal layer on the second passivation layer;

forming an aluminum-based layer on the corrosion-resistant metal layer; and

patterning the aluminum-based layer and the corrosion-resistant metal layer so as to form a double-layered reflective electrode and expose the gate pad terminal and data pad terminal.

2. The method of claim 1, wherein the first layers of the gate line, gate electrode and gate pad are one of aluminum or aluminum neodymium.

3. The method of claim 1, wherein the second layers of the gate line, gate electrode and gate pad are titanium.

4. The method of claim 1, wherein the data line, source and drain electrodes, capacitor electrode and data pad are formed of chromium.

5. The method of claim 1, wherein the gate pad terminal, data pad terminal and transparent electrode are formed of a transparent conductive material selected from a group consisting of indium tin oxide, indium zinc oxide and indium tin zinc oxide.

6. The method of claim 1, wherein the corrosion-resistant metal is molybdenum.

7. The method of claim 1, wherein the aluminum-based layer is aluminum neodymium.

8. The method of claim 1, wherein the aluminum-based layer is pure aluminum.

9. A method of fabricating an array substrate for use in a transfective liquid crystal display device, the method comprising the steps of:

forming a gate line, a gate electrode and a gate pad all having a single-layered structure on a substrate;

forming a gate-insulating layer on the substrate to cover the gate line, the gate electrode and the gate pad;

forming an active layer and an ohmic contact layer over the gate electrode;
forming a data line, source and drain electrodes on the ohmic contact layer, a capacitor electrode over the gate line, and a data pad at the end of the data line, thereby defining intermediate structures;

forming a first passivation layer to cover the intermediate structures, the first passivation layer having a first drain contact hole to the drain electrode, a etching hole corresponding to a transmissive portion, a first capacitor contact hole to the capacitor electrode, a gate pad contact hole to the gate pad, and a data pad contact hole to the data pad;

forming a gate pad terminal, a data pad terminal and a transparent electrode in the transmissive portion, the gate pad terminal contacting the gate pad through the gate pad contact hole, the data pad terminal contacting the data pad through the first data pad contact hole, and transparent electrode contacting the drain electrode and capacitor electrode through the first drain and capacitor contact holes;

forming a second passivation layer to cover the transparent electrode, the gate pad terminal and the data pad terminal, the second passivation layer having a second drain contact hole over the drain electrode and a second capacitor contact hole over the capacitor electrode;

forming a reflective electrode having the transmissive portion on the second passivation layer; and

patterning the second passivation layer using a dry etching method so as to expose the gate pad terminal and the data pad terminal.

10. The method of claim 9, wherein the gate line, gate electrode and gate pad are formed of a material selected from a group consisting of aluminum, aluminum neodymium, tungsten, chromium and molybdenum.

11. The method of claim 9, wherein the first passivation layer is formed of is a material selected from a group consisting of silicon oxide, silicon nitride, benzocyclobutene and acryl-based resin.

12. The method of claim 9, wherein the gate pad terminal, data pad terminal and transparent electrode are formed of a transparent conductive material selected from a group consisting of indium tin oxide, indium zinc oxide and indium tin zinc oxide.

13. The method of claim 9, wherein the second passivation layer is formed of silicon oxide.

14. The method of claim 9, wherein the second passivation layer is formed of silicon nitride.

15. The method of claim 9, wherein the reflective electrode is formed of an aluminum-based resin selected from a group consisting of aluminum and aluminum-based material.

16. The method of claim 9, wherein the patterning the second passivation layer uses the reflective electrode as a mask.

17. The method of claim 9, wherein the patterning the second passivation layer uses a photo resist for the reflective electrode as a mask.

18. The method of claim 17, wherein the photo resist is removed using an ash process.

19. A method of fabricating an array substrate for use in a transflective liquid crystal display device, the method comprising the steps of:

forming a gate line, a gate electrode and a gate pad on a substrate;

forming a gate-insulating layer on the substrate to cover the gate line, the gate electrode and the gate pad;

forming an active layer and an ohmic contact layer over the gate electrode;

forming a data line, source and drain electrodes on the ohmic contact layer, a capacitor electrode over the gate line, and a data pad at the end of the data line, thereby defining first intermediate structures;

forming a first passivation layer to cover the first intermediate structures, the first passivation layer having a first drain contact hole to the drain electrode, a etching hole corresponding to a transmissive portion, a first capacitor contact hole to the capacitor electrode, a first gate pad contact hole to the gate pad, and a first data pad contact hole to the data pad;

forming a gate pad terminal, a data pad terminal and a transparent electrode in the transmissive portion, the gate pad terminal contacting the gate pad through the first gate pad contact hole, the data pad terminal contacting the data pad through the first data pad contact hole, and transparent electrode contacting the drain electrode and capacitor electrode through the first drain and capacitor contact holes, thereby defining second intermediate structures;

forming a second passivation layer to cover the second intermediate structures, the second passivation layer having a second drain contact hole over the drain electrode, a second capacitor contact hole over the capacitor electrode, a second gate pad contact hole over the gate pad, and a second data pad contact hole over the data pad;

forming a corrosion-resistant metal layer on the second passivation layer;

forming an aluminum-based layer on the corrosion-resistant metal layer;

patterning the aluminum-based layer so as to form a second layer of a double-layered reflective electrode having a transmissive portion; and

patterning the corrosion-resistant metal layer so as to form a first layer of the double-layered reflective electrode having the transmissive portion.

20. The method of claim 19, wherein the first passivation layer is formed of one of benzocyclobutene and acryl-based resin.

21. The method of claim 19, wherein the gate pad terminal, data pad terminal and transparent electrode are formed of a transparent conductive material selected from a group consisting of indium tin oxide and indium zinc oxide.

22. The method of claim 19, wherein the second passivation layer is formed of is a material selected from a group consisting of silicon oxide, silicon nitride, benzocyclobutene and acryl-based resin.

23. The method of claim 19, wherein the corrosion-resistant metal layer is chromium.

24. The method of claim 19, wherein the aluminum-based layer is one of aluminum and aluminum neodymium.

25. The method of claim 19, wherein patterning the aluminum-based layer uses a mixed etching solution with phosphoric acid, acetic acid and nitric acid.

26. The method of claim 19, wherein patterning the corrosion-resistant metal layer uses a ceric ammonium nitrate solution.

27. A method of fabricating an array substrate for use in a transflective liquid crystal display device, the method comprising the steps of:

forming a gate line, a gate electrode and a gate pad on a substrate;

forming a gate-insulating layer on the substrate to cover the gate line, the gate electrode and the gate pad;

forming an active layer and an ohmic contact layer over the gate electrode;

forming a data line, source and drain electrodes on the ohmic contact layer, a capacitor electrode over the gate line, and a data pad at the end of the data line, thereby defining first intermediate structures;

forming a passivation layer to cover the first intermediate structures, the passivation layer having a drain contact hole to the drain electrode, a etching hole corresponding to a transmissive portion, a capacitor contact hole to the capacitor electrode, a gate pad contact hole to the gate pad, and a data pad contact hole to the data pad;

forming a gate pad terminal, a data pad terminal and a transparent electrode in the transmissive portion, the gate pad terminal contacting the gate pad through the gate pad contact hole, the data pad terminal contacting the data pad through the data pad contact hole, and transparent electrode contacting the drain electrode and capacitor electrode through the drain and capacitor contact holes, thereby defining second intermediate structures;

laser-treating the transparent electrode;

forming a corrosion-resistant metal layer to cover the second intermediate structures;

forming an aluminum-based layer on the corrosion-resistant metal layer;

patterning the aluminum-based layer so as to form a second layer of a double-layered reflective electrode having a transmissive portion; and

patterning the corrosion-resistant metal layer so as to form a first layer of the double-layered reflective electrode having the transmissive portion

28. The method of claim 26, wherein the transparent electrode is one of indium tin oxide and indium zinc oxide.

29. The method of claim 26, wherein the corrosion-resistant metal layer is one of chromium and molybdenum.

30. The method of claim 26, wherein the aluminum-based layer is one aluminum and aluminum neodymium.

31. The method of claim 26, wherein patterning the aluminum-based layer uses a mixed etching solution with phosphoric acid, acetic acid and nitric acid.

32. The method of claim 26, wherein patterning the corrosion-resistant metal layer uses a ceric ammonium nitrate solution.

33. A method of fabricating an array substrate for use in a transfective liquid crystal display device, the method comprising the steps of:

forming a gate line, a gate electrode and a gate pad on a substrate;

forming a gate-insulating layer on the substrate to cover the gate line, the gate electrode and the gate pad;

forming an active layer and an ohmic contact layer over the gate electrode;

forming a data line, source and drain electrodes on the ohmic contact layer, a capacitor electrode over the gate line, and a data pad at the end of the data line, thereby defining first intermediate structures;

forming a passivation layer to cover the first intermediate structures, the passivation layer having a drain contact hole to the drain electrode, a etching hole corresponding to a transmissive portion, a capacitor contact hole to the capacitor electrode, a gate pad contact hole to the gate pad, and a data pad contact hole to the data pad;

forming a gate pad terminal, a data pad terminal and a transparent electrode in the transmissive portion, the gate pad terminal contacting the gate pad through the gate pad contact hole, the data pad terminal contacting the data pad through the data pad contact hole, and transparent electrode contacting the drain electrode and capacitor electrode through the drain and capacitor contact holes, thereby defining second intermediate structures;

laser-treating the transparent electrode;

forming a reflective metal layer to cover the second intermediate structures, the reflective metal layer having a enough thickness;

forming a photo resist on the reflective metal layer;

patterning the photo resist using a photolithography process to expose portions of the reflective metal layer;

etching half of the exposed reflective metal layer;

removing the photo resist completely using a wet stripper; and

etching the residual reflective metal layer so as to form a reflective electrode.

34. The method of claim 32, wherein the transparent electrode is one of indium tin oxide and indium zinc oxide.

35. The method of claim 32, wherein the reflective metal layer is one aluminum and aluminum neodymium.

36. An array substrate for use in a transflective liquid crystal display device, comprising:

a substrate;

at least one gate line and at least one gate electrode formed on the transparent substrate;

a gate-insulating layer formed over the at least one gate line and the at least one gate electrode;

a silicon layer formed on the gate-insulating layer, the silicon layer being positioned above the at least one gate electrode;

a source electrode and a drain electrode formed on the silicon layer and spaced apart from each other with the silicon layer overlapped therebetween, wherein the at least one gate electrode, the source electrode, the drain electrode, and the silicon layer define a thin film transistor (TFT);

at least one data line;

a first passivation layer covering the at least one data line;

a transparent electrode formed on the first passivation layer; and

a reflective electrode formed on the transparent electrode.

37. The array substrate of claim 35, wherein the reflective electrode has a double-layered structure.

38. The arrays substrate of claim 35, further comprising a second passivation layer between the transparent electrode and the reflective electrode.